agriculture

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A Welsh Halfbred ewe lamb, mated in her first year, with her Southdown cross lamb

The £10 Welsh Halfbred

OFFICIAL SALES 1972

Builth Wells—Weds. 30th August

Llangollen—Tues. 5th September

Welshpool—Thurs. 21st September

Last year large numbers of buyers at the Official Welsh Halfbred Sales took home consignments of *Ewe Lambs* bought for about £10 apiece. Our Field Officer confirms that many of these buyers have achieved 100 per cent lambing from these Ewe Lambs, while 90 per cent is commonplace. By the time she is mated for the second time (as a yearling) the Ewe Lamb will have earned £7 or more (90 per cent lambing plus fleece), have appreciated in value by up to £8, and be all set for a long profitable life with virtually nil depreciation. The welsh Halfbred ewe lamb is thus a first-class buy both for those already in sheep and for those starting up or coming back in sheep.

The same Welsh halfbred as a two-year old with her Suffolk cross twin lambs, ready for sale.

(031)

Herdsman on Walford Smallholding with Ayrshire cows on roadside paddock. Collecting yard, parlour entrance and end of cubicles in background

An account of farming as practised on the Shropshire Farm Institute's

Walford Smallholding

Gordon Salmon

FIFTY Ayrshire cows on thirty-five acres of grassland produced an average of 1,035 gallons each last year, and on some days overfilled the 216-gallon bulk tank that was thought to be too large when first installed! That is one achievement at the Walford Smallholding. The farm was described in *Agriculture* in July 1968 and this article recounts the developments that have since taken place.

This small farm adjoins, and as a teaching unit is complementary to, the Main Farm at the Shropshire Farm Institute, seven miles north-west of Shrewsbury. The Institute and its farms lie on the southern edge of the Cheshire plain, where farming concentrates mainly on dairying. So it seemed logical when the small farm was established in 1952 to make dairying the main enterprise, although at first there were other sources of income.

Since the early 1950s many farms of similar size have disappeared due to the changing structure of the agricultural industry, with its gradually developing larger units. At the same time many farmers have gone out of milk production, and those that have remained are keeping more cows in larger units. At the Walford Smallholding, although small in acreage, we feel we have succeeded in building up quite a large business, with the sale of 51,759 gallons of milk per year from a herd of fifty cows, which appears to be the ideal number for our conditions.

Changing enterprise

The changes that have taken place since the Smallholding was established are interesting in that they tend to reflect many of the changes that have been forced upon the industry at large, namely a move towards simplification and intensification. Briefly, these developments are:

Establishment (*1952-1959*). Sixteen milkers were cowshed housed, replacements being reared together with small scale pigs and poultry. Some cash roots, kale and cereals were grown in addition to grass. This was a typical mixed farm of those days.

Simplification and specialization (*1959-1964*). Grass and kale were strip grazed; and cow numbers increased, first to twenty-eight and latterly to forty as a 'flying herd' was developed. The use of fertilizer increased considerably. Now there were no pigs, poultry, roots or cereals.

Further intensification (*1964-1967*). The all-grass farm carried up to fifty-seven Ayrshire cows, paddock grazed. Loose housing, together with a parlour and bulk tank, had been established. All food for winter maintenance and production was bought in, and milk sales reached 46,000 gallons, with a stocking rate of 0·61 acres per cow.

Consolidation (*1967-1972*). With the basic system established, it was evident that specialized milk production, with a high output per acre, was the only viable system for this farm. Although we could probably have carried sixty cows on the holding, this would have required more capital to purchase the additional cows and provide the necessary housing, putting even more stress into the system. We decided, therefore, not to raise cow numbers with further intensification, but to try to improve still further the output per acre by increasing both the quantity and the quality of the milk produced; and if necessary to achieve this to reduce cow numbers to 50–52.

Way to success

We felt that these aims might be achieved by a combination of the following:

keeping a better type of cow;

better winter feeding;

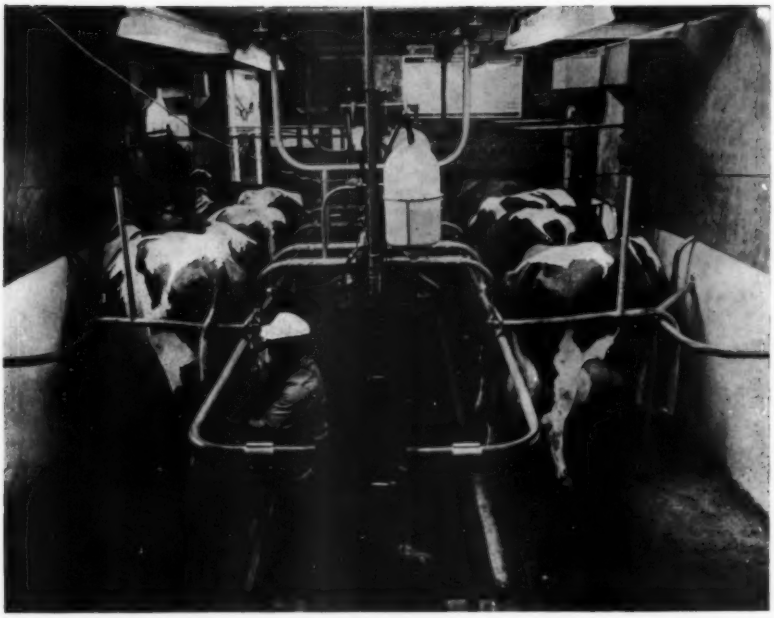
better winter housing;

slightly less intensive grazing during the summer; and

a high level of stockmanship.

There have always been Ayrshire cows on this farm; in the past animals were purchased locally on visual assessment and, whenever possible, with available records. Since 1967, in-calf Ayrshire heifers have been bought from good Brucellosis Accredited herds backed by good records. They have cost more, of course, but did appear to give a better guarantee of performance and profitability for the future; I think the increased yields have justified this hope. How long can we rely on this 'buying-in' policy, which is both costly and risky, is uncertain. A reliable 'contract rearer' may be the answer.

In previous years a number of different winter rations have been tried. At one time a ration based on barley straw, rolled barley and a balancer had seemed to offer a possible answer to the provision of cheaper winter keep for this type of herd, where we rely on 'shopping around' each summer for this



4-point herringbone parlour on the Smallholding

feed. Unfortunately both the barley straw and the barley itself became progressively more expensive, and some of the results achieved, particularly in connection with milk quality and infertility, were not up to our original expectations. Therefore in this most recent phase we have reverted to an old-fashioned ration based on a minimum of 12 lb of good hay, together with rolled barley, dried sugar beet pulp and minerals, and this usually provides maintenance and perhaps ½ gallon of production. By buying in the bulk of the hay we have only ourselves to blame if we accept delivery of anything but a good sample! Each year we do make a few tons of hay when there is a surplus of grass on the paddocks, but not much surplus can be expected with fifty cows on thirty-three effective acres of grazing. During this period dairy cake prices have increased from about £34 to £43 per ton and are likely to increase still further.

In the years immediately preceding 1967, the cows were loose-housed and received their maintenance ration at an outside feed barrier. During that autumn, forty-seven cubicles were erected by the herdsman with the help of casual labour at a cost of £14 per cow before grant. At the same time a tombstone feed barrier was put up under the Dutch barn lean-to roof where the cows had previously been housed. In general these changes have proved very satisfactory and greatly reduced straw usage. The only problem experienced was that kennels had to be along an east/west access, and when the east wind blew tended to form an icy wind tunnel. This was corrected simply by putting a wind-proof gate at the east end and the cows are now really contented.

We have, therefore, now moved to a situation where we are gradually getting an increased number of better-bred cows; they are receiving a good nutritious winter maintenance ration, fed under cover, and are lying comfortably and far more cleanly in the cublicles. The following records illustrate the progress made:

	1967/68	1968/69	1969/70	1970/71
Farm size (acres) (33 effective acres)	35	35	35	35
Average herd size	57	51	52	50
Stocking rate (acres per cow)	0·61	0·69	0·67	0·70
Annual milk production (gal)	48,231	41,339	49,459	51,759
Milk production per cow (gal)	849	810	962	1,035
Value of milk sales per cow (£)	138	133	152	179
Margin of milk sales per cow over cost of production concentrates (£)	92	89	101	116
Composition class	7	7	10	11

Note: During 1968/69 the herd was affected by 'consequential losses' following the foot-and-mouth epidemic in this area.

Grazing land

The land on the farm is heavy and rather wet, but it can grow grass. Unfortunately, due to the soil conditions the grazing season is often rather short; we cannot normally expect to turn out in the spring until the second

Ayrshire herd on paddock boundary fence

Cows being brought in off the paddocks for milking

or third week in April, and in the autumn the cows have to be housed early, otherwise the damage to the sward from poaching could be severe. Poaching and contamination of herbage has not proved too serious a problem, with perhaps one exception, and that was in May 1969 when there was over 6 in. of rain. Grass that was not trodden in was soiled, and damage to the access areas was considerable; in fact we had to resort for all practical purposes to winter feeding. Alternative grazing during such a difficult period would have been a great help.

Our paddock grazing policy has been continued with the fifty or so cows now kept. The farm is divided into six small fields, each further divided into four paddocks, thus providing twenty-four paddocks of approximately equal size. There used to be twenty-one paddocks, but the present number is more satisfactory. The fertilizer programme is typical and well-established these days; after an initial top dressing of nitrogen we alternate applications of a compound and straight nitrogen, normally applying 40 units N after each grazing. Total application in a season is about 250–300 units N and 60 units P and K. It is found in most summers, even with a stocking rate of 0·7 acres per cow, that there is usually sufficient grass to satisfy the herd. The two main problems are coping with a surplus in the early summer and then overcoming the rather lean period often experienced in July, one of the driest and hottest months. Conservation of small surplus quantities on a farm such as this does create a very real problem and there is no doubt that, from the paddock grazing angle, cutting for silage, which allows quick application of fertilizer and a rapid recovery of the grass for further grazing, is ideal. However, very small parcels of silage are notoriously difficult to make and in recent years this has not been attempted at all. Committed to a winter

Ayrshire cows at feed barrier under lean-to roof

maintenance ration based on hay, we have recently made any surplus into hay, accepting the fact that the grass is rather a long time coming back into production.

Being on good fertile land, we now rely on long leys based on varieties of perennial ryegrass, and more recently have been using straight S.23 with 1 lb of white clover which we find does persist, despite the high nitrogen usage. There are signs that S.23 is a partial answer, at any rate, to the invasion by annual meadow grass, one of our main grassland problems on both of the Institute farms.

As stated, the land is heavy and the cows have to be brought in fairly early in the autumn. Consequently there is usually a considerable amount of grass left on the paddocks which not only goes to waste but renders the grass more susceptible to frost damage during the winter. To counter this, for the last three years we have taken in 100–160 'keeper' breeding ewes which have remained on the farm until about the first week in January. Until then they do a tremendous amount of good in tidying up the surplus, but I am convinced that if they remained longer they would cause damage resulting in a reduction in grass growth during the spring.

Stockmanship

Turning to the vital question of stockmanship, we sought not only to obtain higher yields but also to keep accurate records, carefully ration maintenance and production foods, obtain a good calving index and reduce disease and veterinary costs to a minimum—an ideal indeed! The cows are put to A.I., normally a Charolais bull, and this is paying dividends at the moment with the current high calf prices. Any cow not bulling six weeks after calving is

inspected by the veterinary surgeon, and all cows are pregnancy diagnosed eight weeks after service. The herd is tested for mastitis under the Milk Marketing Board Cell Count Scheme, and we teat dip and practice dry cow therapy. Milk fever is probably our most serious problem at present, although vitamin D3 injections are helping to reduce the incidence. Costing the herd under the A.D.A.S. Dairy Management Scheme, is also proving very useful.

What of the future?

The system adopted over the last four to five years does appear to have achieved the target we set outselves, increasing output per cow and per acre. However, 'fixed and variable' costs have risen dramatically; as a result a great deal of our extra income has been whittled away, although with present milk returns the situation is considerably brighter. For example, A.D.A.S. costings show that in the twelve months ending January 1972 we produced 1,125 gallons per cow, worth £218·50, giving a margin over total concentrate costs of £142·80 per cow.

Where do we go from here? We decided to go Accredited under the Brucellosis Scheme as this would increase the farm income by about £400 per annum. In the attempt we experienced some bad luck and have had to cull seven reactors, and now await the final blood test. Shall we run into trouble again with our 'buying in' policy, or should we try to rear our own replacements? Clearly the present farm is too small for this, so should we try to find more acres? Finally, what is going to happen to feed prices? Under our system we are very exposed to price increases and further economy lies only in even more efficient use of summer grass.

One of the reasons why such a farm was established at Walford was to pose just such problems as a challenge for the staff and students. In our attempts to overcome and solve these practical and economic problems, I like to think we all keep our feet firmly on the ground.

Gordon Salmon, N.D.A., is Vice-Principal of the Shropshire Farm Institute, at Walford, Baschurch, Shrewsbury.

Rinse out that container!

The smallest amount of toxic chemical left in a used container can be a real danger to children and animals. If it gets into a ditch or stream it can also poison fish and livestock.

Empty metal, plastic or glass containers should be thoroughly washed out and the washings added to the contents of the spray tank; returnable containers should be sent back to the suppliers without delay. Cardboard containers and plastic sheet bags should be emptied completely and these and other combustible containers should be burned. Non-returnable containers which will not burn should be punctured and flattened if appropriate and buried at least 18 inches deep in an isolated area: cleaned glass containers may also be disposed of with other refuse. Aerosol dispensers should *not* be punctured or burned. On no account should empty pesticide containers be used for any other purpose.

Partly-full containers should be tightly closed and stored in a safe place away from feedingstuffs and out of reach of children and animals.

Pesticides should never be transferred into other containers, especially beer and soft drink bottles.

'For the Land Could not Maintain Them'
—Daniel Defoe 1727

Farmers of Halifax and the Calder Valley

P. E. Williams

WERE Daniel Defoe to retrace his journey of 1727 from Littleborough on the A58 to Halifax he might well again say of the farmers 'For the land could not maintain them'.

Historically, land-using enterprises did not provide the main source of income for farmers of the area, that being the cottage industry of cloth making. Today, such alternative sources of income have disappeared or are disappearing with the swift growth of large-scale, specialist, livestock units. No longer can small, open-air poultry rearing units provide reasonable incomes. Declining local industrial undertakings cause small farmers seeking part-time work to look further afield only to find that the demand for unskilled labour is diminishing.

A history of the area

One history book describes the old parish of Halifax as being situated on the high slopes of the Pennine Range, its people living, as it were, on the slope of a roof—the ridge being the boundary between the counties of York and Lancaster. The history of Halifax parish is rather a peaceful account of turning woods and moorlands into fields, and the development of the Cloth Industry. The farms of Saltenstall are particularly old—over 600 years ago the Earl Warren had meadows and pastures for his cattle, the top of these fields being 1,000 ft above sea level with the moors above stretching over 1,400 ft. The high moorland was too bleak for cultivation, the valley bottoms too steep and wooded to clear for farms, so the early settlers lived on the high terrace with woods below and moors above. This pattern can be seen particularly well today at Hebden Bridge (the woods of Hardcastle Craggs in the bottom, the Wadsworth farms above, and above them the moors).

Most of the older hamlets are high up on the hills—for example, Sowerby, Norland, Heptonstall and Soyland; and these places were formerly the centres of trade and population, holding pre-eminence until the end of the eighteenth century. Travel from hamlet to hamlet was of necessity restricted, and small closed communities were a result. The open-field method of farming continued in a fashion until the beginning of the last century. As the number of people increased, more land was needed for farming; so a new piece of hilly land was marked out, trees cut down, rocks broken up, loose stones gathered and walls built to fence the land.

For many centuries Halifax weavers produced coarse cloth and from the earliest days cloth-making was a home occupation. As the area was very poor agriculturally, the cloth trade flourished and grew. The natural advantages

of the area were plenty of good water together with coal for fuel, and there were no Guilds to create restrictive practices.

From 1475 to 1775, Halifax produced more cloth than any other parish in the West Riding. The area prospered and as the growing population required more cultivated land, many fields were won from wasteland. About 1525, a William Lister of Illingworth took sixteen and a half years to win 8½ acres from waste to add to his farm. Over a period of sixty years, 280 acres were enclosed from waste within the parish. In 1580, Camden the Antiquary said the number of men in Halifax was greater than the total of cows, horses and sheep, whilst the reverse was the case in the rest of England —this because Halifax lived by cloth-making and not by farming.

Daniel Defoe's description of his journey from Lancashire to Yorkshire over the heights of Blackstone Edge in 1727 lays the foundation for an appreciation of present day farming problems. He says 'though they were in the middle of August, the harvest was hardly got in and they saw the mountains covered in snow, and felt cold acute and piercing'. Defoe continues, 'From Blackstone Edge to Halifax is 8 miles and all the way, except from Sowerby to Halifax is thus up hill and down, so that I suppose we mounted to the clouds and descended to the water level about eight times in that little part of our journey'.

On emerging from the mountains, Defoe was astonished to find himself in a country which everywhere presented the strongest signs of population, industry and wealth; where 'the sides of the hills which were very steep were everywhere spread with houses . . . the land being divided into small enclosures of from 2–7 acres each, their business is the clothing trade . . . such has been the bounty of nature that two things essential to the business . . . are found here . . . coals, and running water on the tops of the highest hills—this seems to have been directed by the wise hand of Providence, for the very purpose which is now served by it, mainly the manufacturers which otherwise could not be carried on, neither indeed could one-fifth part of the inhabitants be supported without them. For the land could not maintain them'.

These agricultural weavers, who eked out scanty earnings by cultivating a few acres of ground, formed an important section in the industrial and economic life of the West Riding. They survived into the nineteenth century, long after their common rights had past away. The allotment or poultry rearer took the place of the subsistence farming of his eighteenth century forebears. Many consider that if enclosing had been carried on with a nicer regard for the rights of the smallholder of common land this class might have continued; but they were crushed out of existence, rather by the better organization of industry than by the systematic encroachment of their powerful neighbours. The life of constant change from weaving to agriculture fostered their hatred of monotony—these men, it was suggested, were valuable at ensuring the expansion of the colonies but useless as components of highly specialized industrial development. By the turn of this century, the factory system had displaced the domestic system, and on the uplands between Shore and Blackshaw Head, farms were almost deserted, with farmhouses lying in ruins.

The growth in industrialization eventually gave great advantages to the farming in the area, even in the face of rising land values, because of the possibility of supplying a rapidly growing demand for farm products. But the see-saw in fortunes continued—the cotton boom of the First World War, the

slump of the 30s, the Second World War boom, supported by the spread of Milk Marketing Board activities, the slump in free-range poultry of the late 50s and, today, the tremendous cost pressures on the remaining crutch of wholesale milk production.

Ruined farm in an area known as Colden near Heptonstall

Full-time farming problems

Producer/retailers apart, only the efficient dairy farmers can hope to generate sufficient capital to expand in wholesale milk production. Apart from the various natural problems of the area, the wholesaler is faced today with other problems—problems of farms having too small acreages, of old buildings too well constructed and extremely difficult to convert cheaply to labour-saving systems. Atmospheric pollution, the fear that land, even if available, will attract too much speculative money. The farmers own disinterest in change, coupled with the nearness of part-timing if things get too bad. Lack of fundamental farming know-how.

The industrial situation

In 1968 the Yorkshire and Humberside Economic Planning Council survey gave an up-to-date industrial situation report indicating the main industries to be textiles (particularly carpets), engineering (mainly machine tools) and confectionery.

There is a fair provision of most services—a strong community life, and both town and country have a character of their own; there are many opportunities for recreation and there could be more. But the study confirmed that the area faces further decline unless co-ordinated action is taken to prevent it.

Completion of the M62 motorway, it is suggested, will greatly assist the area's position in the national trunk road network. The industrial structure is antiquated, limited in range with below average earning and working conditions, but no shortage of jobs. Housing is of low quality and the area suffers disadvantage of climate, air pollution and dilapidation. Its hilliness means a shortage of land for development, the population has dwindled and is likely to continue to do so for many years. Many who stay on may well be content with slowly improving conditions, and the most active elements will therefore leave. Development will need land but modification of green belts should not be lightly undertaken. Due weight must be given to the needs for flat, level sites (is that the best agricultural land?) for both industrial development and housing. Concerning labour mobility, the report said that there is a reluctance to travel more than a short distance from home to work.

Part-time farming

How many part-time farmers are there in the area? The 1968 Ministry of Agriculture, Fisheries and Food parish summaries mentions 1,062 holdings above ¼ acre but, of these, only 252 had a business larger than 275 standard man days. This is not surprising when one looks at a breakdown of the holdings into acreage groups:

530	holdings	were	between	¼	and 19¾ acres
399	,,	,,	,,	20	,, 49¾ acres
116	,,	,,	,,	50	,, 99¾ acres
13	,,	,,	,,	100	,, 149¾ acres
4	,,	,,	,,	150	,, 299¾ acres

There were no farms over 300 acres.

A detailed survey of Wadsworth Parish in 1967 by the Yorks and Lancs. Hill Farming Groups of the old National Agricultural Advisory Service (now Agricultural Development and Advisory Service) showed that there were twenty-five farmers who had between 250 and 400 standard man days, three retired farmers, fifteen known part-timers. There were twenty-two registered milk producers in 1967, which had dropped to sixteen by 1969.

The sort of part-time occupations the part-time farmers have in the area vary considerably, from general grocer, or butcher, to property dealer or solicitor.

During the last three years about sixty part-timers have been visited to give technical and/or financial advice. On average, they farm about 25 acres of crops and grass plus about 15 acres of rough grazings. Some seventeen had no previous knowledge of farming and are outsiders who came into the Pennines. Some of the reasons given for having land were:

They liked the idea of a country life.
They hoped eventually to sell land for building development.
They had ill-health.
They needed extra income.
They had an early ambition to keep livestock.
They were semi-retired, and wanted seclusion.
They had a pressure from their industrial undertakings on their health.
They had always lived on a smallholding.
They hoped to become full-time farmers.

An attempt has been made to assess their ability, ambitions and capital position under a scoring system from 1–10: for ability they scored 3·9, for ambition 6·2, and for capital 4·2.

Established part-time farmers do not seem to present too much of a problem at the present time. The problem now is for the full-time farmer who may either have to get out of farming completely or seek alternative part-time jobs to supplement low farming income. Part-timers are generally loath to travel far to work, now, so whether future part-timers would do so is very unlikely. If only the successful and modernized industries are to survive, it is expected they will want at least semi-skilled labour and it is questionable whether there will be much place in the future for the farmer who hopes to survive by looking for unskilled part-time work. (In 1967 only 17 per cent of male vacancies were for completely unskilled work). The Yorkshire and Humberside report has the following to say:

'An interesting feature of the results is the marked variation in the experience of different sizes of firms. The larger firms found less difficulty than the smaller in recruiting skilled male labour, but in the less skilled grades, other workers and clerical and office staff, the larger firms found it more difficult than the smaller to recruit either males or females. One possible explanation of this is that whereas skilled men are attracted to larger firms with their (generally) better prospects and conditions the unskilled prefer the small local firm, so avoiding expenditure on transport to work. The fact of convenience of workplace to the home is likely to be particularly important to married women workers, consideration of which local employers are very conscious.

It is of interest to know that nine of twenty-one engineering firms offered part-time work, twenty-four of thirty-four textile firms, seven of seven clothing firms, and five of eight food firms.

There is an excess demand for female labour, and transport in fact brings about 400 women to Halifax from the coalfields daily.

The M62 motorway will bring Royton, Leeds and Bingley within thirty minutes travelling time of Halifax, it will bring Prestwick, Yeadon and Pontefract within thirty minutes of Brighouse and Liverpool and York within sixty minutes of Brighouse'.

Waning vocation

More and more townspeople are looking for accessible country cottages with a few acres, and the new motorways are bringing previously inaccessible areas to within commuting distance. With 20–30 acre holdings having seventeenth century farm houses now fetching £6,000 and upwards we are witnessing the beginning of the end of the industrial Pennine small farmer.

Whilst beauty lives in the eye of the beholder let us hope that no future Defoe writes of the newcomers, 'For they cannot maintain the land'.

P. E. Williams, N.D.A., M.R.A.C., is the District Agricultural Adviser with A.D.A.S., Yorkshire (West Riding).

The caption under the photograph printed on page 244 of the June issue of *Agriculture* should have referred to the pigs as being '5-6 week-old', not '26-week-old'. We apologise for this error.

Visual Satisfaction in Farm Buildings

W. A. R. Harris

For various reasons, the standard of architecture achieved in our farm buildings during the past thirty years, apart from a few exceptions, has not been of too high a standard. It is true that the agricultural industry cannot afford luxuries but if good architectural design is to be regarded as no more than a luxury, it is a reflection on farming remuneration and perhaps a confusion of priorities. More rightly it can be argued that a pleasing design is a long term necessity both from the amenity and economic points of view.

What is architecture?

Perhaps it would be as well to define true architecture. It is not merely making a dull structure look pretty by ornamentation or enthusiastic application of the paint brush. True architecture is the attainment of technological and functional efficiency, taking into account available resources, combined with visual satisfaction and pleasure. Quite often we have one without the other, but either alone cannot be regarded as pure architecture. Put in another way, architecture is the creation of the most pleasant environment possible for the activities carried out in and around a specific location.

Many of the technical problems concerned with structure and services have been solved but only now are we beginning to realize that man is just as important as the machine or the animals he tends. Labour efficiency and performance is influenced by the ergonomic standard of the working environment. Increasing aesthetic awareness will, no doubt, make an added worthwhile contribution by raising this standard.

Role of the designer

The Architect's aim must be to ensure that he provides for his client a weatherproof building fulfilling the managerial and functional requirements and having the right proportions and, not least, materials tastefully used or combined. The skill is in arranging the same materials that anyone erecting the building would use in the most effective way to achieve their objectives.

Who is likely to provide this tasteful assembly of all the pieces of this rather mundane farm jig-saw puzzle? Here I admit some partiality but would submit that a person trained and experienced in this very function should be expected to make an effective contribution given the opportunity. I am referring mainly to the Architect.

Let us face it, many modern farm buildings are 'cheap' and 'nasty'. But because a building is comparatively cheap it does not necessarily have to be nasty; the word comparatively is used deliberately. There are no really

cheap materials available nowadays and the cheap short-life building philosophy, however desirable a concept, is mostly wishful thinking.

The only thing really 'cheap' about buildings now is the standard of design and sometimes the workmanship. Good design implies attention to detail, the expression of function and at the same time by the skilled employment of design principles, intuitive or otherwise, making the building look right in itself and in its setting.

How does one know when it looks right? What are the basic qualities of a visually satisfying building?

First the building should be 'in scale'. In other words it should bear some recognizable relationship to human dimensions. Secondly, it should have good proportion either in its main dimensions, in the distribution of solid and void in a single block, or in the relative sizes of its wings or ancillary buildings in a multi-unit scheme. Thirdly, widely differing cladding or walling materials should not be used indiscriminately. It is not uncommon to see brick, stone and concrete block, timber, corrugated steel or asbestos cement sheeting all used in the same building, giving, inevitably, a piecemeal impression.

The locality often indicates a material which can be seen to predominate successfully, e.g., limestone in the Cotswolds, but if financial resources preclude the use of genuine materials then the nearest substitute should be used.

Although there may be many interesting features, some focal point should be apparent when the building is seen from the normal viewpoints. All parts of the elevation or layout should look as if they belong together in an integrated composition and not as separate elements intended to exist by themselves.

Colour

Much is now being written about the use of colour in farm buildings and one may be forgiven for being misled into thinking that a pot of paint can solve the amenity problem. But of course colour has always been used in farm buildings, for everything visible has colour; it is the manner in which it is distributed that is important. Nature distributes colour in a most acceptable way. If not maintained, things that are man-made or processed will, at varying rates, break down, weather, rot and rust with an accompanying change of colour. However, with the advent of plastics it is questionable whether or not this will continue to hold true. Apart from their domestic scale, our traditional farmsteads owed much of their charm to the subtle shades and textures evolved by the weathering of their walls and roofs. Bearing this in mind either an attempt should be made to harmonize the building with the background by using colours that are complementary; obviously something approaching camouflage should be avoided. Alternatively a complete contrast can be aimed at as is seen in the old black and white half timbered building and stucco villa on the coast. The danger lies in the possibility of achieving neither alternatives.

Just as a musician can play together many different notes to produce a pleasing sound, so must the designer specify the different colours or gradations in his building to be sympathetic with the surroundings. The achievement in both cases must be harmony. Over emphasis of certain colours in certain situations has the opposite effect to that intended.

To sum up, a farm building will be visually satisfying if the observer is not disturbed—one might even say if he feels a quality of restfulness. The shape

or colour should not make the discerning onlooker attempt, in his mind's eye, 'to put the building right' or to feel a sense of unease or restlessness. Essential details such as rainwater gutters and downpipes, sheet profiles, block and timber textures, copings, plinths, sills, joints between different materials, gates, doors, fences and roadways when designed with care enhance the building and in addition are effective in a practical sense.

Architecture has sometimes been described as 'frozen music'. Without being derogatory, some of our farm buildings' 'architecture' would never have made the top fifty-five let alone the 'Proms'.

W. A. R. Harris, Dip.Arch., A.R.I.B.A., is an Architect with the Lands arm of A.D.A.S. at Aberystwyth.

* * * *

Getting Down to Drainage

On more than half of the agricultural land in England and Wales field drainage is a fundamental necessity for efficient farming. A National Survey by the Ministry of Agriculture, Fisheries and Food has shown that agricultural production on 7 million acres of agricultural land is limited by the absence of efficient drainage systems, while another 7 million acres depend upon the maintenance of existing systems.

The following is a list of leaflets in a series entitled *Getting Down to Drainage* which is designed to help any occupier of agricultural land assess his particular drainage problems and to show what is involved in their solution and in the installation of the most suitable system and its subsequent maintenance:

1. Does your land need drainage?
2. Drainage Economics
3. Drainage Advice
4. Arranging your drainage contract
5. Grants for Field Drainage
6. Drainage Operations
7. Drainage Maintenance
8. Field Drainage—After-care
9. Ditch Elimination
10. Subsoiling
11. Mole Drainage

Single copies of any of these leaflets may be obtained from the Ministry of Agriculture, Fisheries and Food (Publications), Tolcarne Drive, Pinner, Middlesex HA5 2DT.

Dutch Silverskins

Andrew Brown

AN AREA of just over 2,000 acres of silverskin onions for pickling is grown annually in the Netherlands, producing approximately 20,000 tons, just over 3,000 of which are exported to Britain. Table 1 shows the areas and extent of production.

Table 1.

Acreage under silverskin onions in the Netherlands, 1966-68

Area	1966	1967	1968
Schowen–Duiveland	75	93	108
Tholen	478	495	373
South Beveland	203	228	148
North Brabant	923	1,250	1,003
Land of Breda	5	0	128
Remainder	453	360	403
Total	2,137	2,426	2,163

About 60 per cent of the crop is handled by one main processor, the remainder by eight smaller firms. The processor rents the land from the grower annually, accepting complete responsibility for the supply of materials and machines and all operations, including harvesting.

Table 2

Average monthly rainfall in inches: Rotterdam and eastern England

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
The Netherlands (Rotterdam)	2·3	1·6	1·4	1·9	2·0	2·1	2·6	2·9	3·0	3·0	3·3	2·5	28·6
Eastern England	2·1	1·6	1·5	1·8	2·0	1·7	2·5	2·3	2·2	2·2	2·5	2·1	24·5

Climate

As with ware bulb onions, the weather conditions during the harvesting period mid-July to the end of August are critical. Excessive rainfall can result in serious crop losses, any delay in harvesting resulting in a considerable proportion of the onions beginning to shoot and becoming unsuitable for market (see Plate 1). The average rainfall in the Dutch area of production (near to Rotterdam) during the harvest period is 5·5 inches, slightly wetter than in eastern England where the average is 4·8 inches (see Table 2).

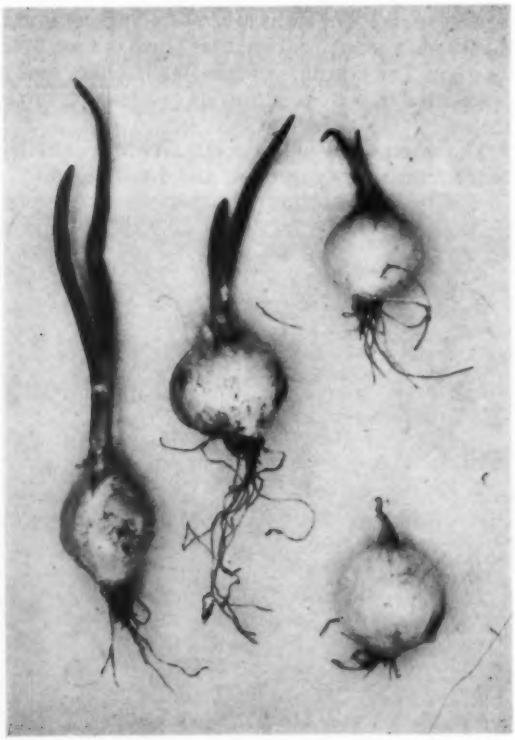


Plate 1. Silverskins shooting, becoming unsuitable for marketing

Soils and manuring

The soil on which the crop is grown in the Netherlands would be classified in England as a silty to silt loam. It is stone-free, has a fairly high water table and contains a clay fraction of approximately 30 per cent which is the proportion considered essential for the production of crisp white onions. Exposure of the surface of the bulbs to light causes a certain amount of greening; therefore any soil which would wash away easily from the surface of the bulbs during heavy rain would be unsuitable.

Analyses of the soil, which is alkaline with a pH of 7·5–8·0, usually determine the base dressings to be used; a standard recommendation is 200 units potash K_2O, 120 units phosphate P_2O_5 and 80–100 units of nitrogen N per acre.

Varieties and sowing

Pompei and Barletta are the most popular varieties grown, but the strain of the variety is of paramount importance. Seed from Israel is said to be more reliable than from other sources; but good quality seed can be obtained from the leading seed houses in the Netherlands. Dutch seed carries a label from the N.A.K.G. (General Netherlands Inspection Service) indicating that it is free from stem and bulb eelworm (*Ditylenchus dipsaci*). Quality of seed of the mid-season and later varieties is said to be more difficult to obtain, thick necks being a particular problem.

Drilling is started in early March and, in an attempt to provide a continuity at harvest, is followed by several drillings up to the end of April. The crop is drilled with an external force feed drill in rows 3–4 in. apart and at a depth of $1\frac{1}{4}$–$1\frac{1}{2}$ in. The rate of sowing is 100–112 lb of seed per acre. Normally drilling is followed by a cross harrowing in an attempt to improve the distribution of the seed in the soil (Plate 2).

The crop usually follows a cereal (wheat or barley) or potatoes. Other crops in the rotation are sugar beet and dwarf beans.

Plate 2. Drilling, followed by a cross harrowing, in an attempt to improve seed distribution

Weed, pest and disease control

Sulphuric acid is widely used for weed control, the rate of application varying from 6–8 per cent depending on the size of the onion and the density of the weeds. Trials are being conducted with some of the newer chemicals, e.g., propachlor, ioxynil and mixtures of ioxynil and linuron.

White rot (caused by the fungus *Sclerotium cepivorum*) and stem and bulb eelworm are the major disease and pest problems. Before a processor will rent

land, the grower must produce a certificate showing that it is free from both. Testing is by a very intensive soil sampling system and is carried out by the Institute at Osterbeek, a grower's organization. Samples, each of 60–80 cores, to a depth of about 75 mm (3 in.) are taken from each $\frac{1}{3}$ hectare ($\frac{2}{3}$ acre); recordings are made of the presence of eelworms and white rot sclerotia as the numbers per kilogram of soil.

Onion fly (*Delia antiqua*) is controlled by spraying the soil prior to drilling with trichloronate (Phytosol); this chemical is claimed to give some control of eelworm also (trichloronate is not available in the U.K. and has not been cleared for growers use under the Pesticides Safety Precautions Scheme). In the case of neck rot (*Botrytis allii*) a seed dressing of benomyl 0·2 per cent powder plus water is said to give a more effective control than an intensive spraying programme. The seed is immersed in the solution for one hour before being dried off and drilled. Leaf rot (*Botrytis squamosa*) is responsible for a spotting of the leaf and a dying back of the leaf tips; it is controlled by routine spraying at weekly intervals from early June to mid-July with a zineb plus maneb solution.

Plate 3. Topping the crop. Condition of crop prior to flaming

Topping

Prior to harvest the onions require topping and in the Netherlands there has been a breakthrough with the introduction of a flaming technique. Hand topping was practised until it became uneconomical. This was followed by spraying with desiccants, for example sulphuric acid and dimexan, but these chemicals proved inconsistent. Mechanical cutting was then tried, but because of the need to clear the cut tops prior to harvest the system was considered uneconomical. Two types of flame burners, one using oil the other propane gas, are being experimented with and both are proving very successful. Equipment for flaming is expensive, however, about £3,000, and

a flame-off with oil using approximately 90 gallons per acre may cost in the region of £30. Plate 3 shows the condition of the crop prior to flaming.

Harvesting for processing

There are several large specialized harvesting machines owned and developed by the bigger processor; the smaller firms use a modified hoover-type side mounted potato harvester. A layer of soil and onions 2–3 inches thick and about 20 inches wide is lifted. As this block passes over the share it is broken up by spiked wheels before passing into a dry rumbler which has

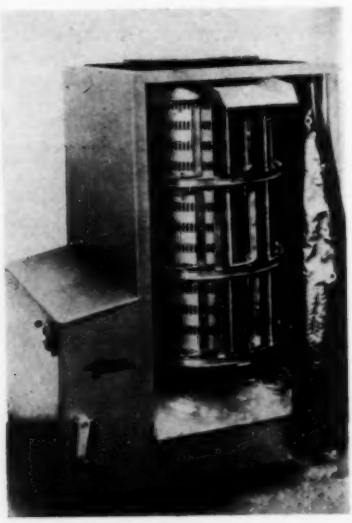


Plate 4. An onion peeling unit

metal bars $\frac{3}{8}$ in. apart, allowing most of the soil to pass through. The onions are dropped on to a short conveyor, leaving the top of the rumbler and are delivered into bulk bins carried on a platform at the rear of the harvester.

One of the major problems at harvest is that the onions cannot be stored for more than about twelve hours prior to their being washed and peeled. This means that the harvesting operation must be organized to fit in with the operation of the line preparing the onions for the processor. The graded onions are placed in polydrums containing 100 kg net weight for immediate delivery to the processor.

Normally up to ten grade sizes are sent to the processor, ranging from 10 mm to 45 mm diameter in steps of 2–5 mm. Very specialized and expensive equipment is required to prepare onions for processing and a line with about 3 ton/hr output may require an investment of up to £50,000. This excludes the cost of the shed, installation of water supply, containers for bringing the crop from the field and for delivery to the processor. The most expensive and important component of the line is the peeling equipment, each unit having a throughput of from 2–6 cwt/hr (Plate 4).

Future supplies

Processors in Britain seem to be interested in finding alternative sources of silverskin onions to those presently available from the Netherlands and, to a lesser extent, from Italy. There would appear to be no technical reason why the crop should not be grown in certain areas of Britain, but because of the high investment in very specialized equipment the interests of the grower and of the processor must be very carefully weighed.

Silverskin onions produced on the silt land at Kirton E.H.S. and on the peat soil of Arthur Rickwood E.H.F. have been assessed by Dr. Scholbey of the British Food Manufacturing Industries Research Association. These tests indicate so far that the skin colour and quality of the onions from the organic soil is poorer than that produced on the silt land. Soils that compare most favourably with the polder land in the Netherlands are the heavier silt soils in north Lincolnshire.

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Costs and Efficiency in Milk Production 1968/69

National investigations into the economics of milk production in England and Wales have been undertaken at regular intervals since 1934. The latest report of investigations in this series* gives costs and returns of the milk enterprise on a sample of 426 dairy farms during the period 1st April 1968 to 31st March 1969, together with the results of a further limited survey in 1970. The 1968/69 survey, like its predecessor for 1965/66, was based on dairy farms selected at random from the Agricultural Census returns and the results reflect the national economic and physical condition of milk production. The survey compares information for 1968/69 with that for 1965/66, and presents some results in terms of gross margins.

The report also discusses the factors which have led to an average annual decline of nearly 4 per cent in the number of registered milk producers since 1965/66 whilst the number of cows in the national herd has increased slightly.

The main changes in technical performance between 1965/66 and 1968/69 have been increasing milk yield per cow, higher stocking rates closely linked with higher nitrogen use on grassland, and a lower labour requirement per cow, 73 hours per year in 1968/69 against 88 in 1965/66. The use of concentrates per cow and per gallon increased slightly and the report suggests that dairy farms use more intensive grass and forage production to increase stocking rates, rather than to substitute forage or grazing for concentrates.

The survey was carried out by University Departments of Agricultural Economics in England and Wales and the report was compiled by a group representing the Ministry of Agriculture, Fisheries and Food, University Departments and the Milk Marketing Board, with Mr S. R. Wragg of the University of Bristol, who also edited the report, as Chairman.

*Copies of *Costs and Efficiency in Milk Production 1968/69* may be obtained, price 52½p (55p by post), from H.M. Stationery Office, P.O. Box 569, London S.E.1, or through any bookseller, quoting SBN 11 240512 6.

N.I.A.B. trials throw more light on

Brown Rust of Barley

N. H. Chamberlain J. K. Doodson

BROWN rust of barley (*Puccinia hordei* Otth) has been recorded in Britain for many years but has usually been of no economic importance. In recent years it has been recorded more frequently and has been widespread, causing severe infections.

The disease has been assessed from 1958 to the present time in variety trials conducted by the National Institute of Agricultural Botany and by the Institute in co-operation with the Agricultural Development and Advisory Service (formerly N.A.A.S.). Before 1966 the disease was recorded mainly in trials in southern England; by 1969 severe infections had been recorded frequently in East Anglia and the Midlands, later as far north as Yorkshire (Fig. 1).

Symptoms

Small, brown coloured pustules containing masses of spores (uredospores) are scattered irregularly over the leaf blade (Plate 1) and may also develop on the leaf sheath, the culms and the ears. These pustules may be seen in May or June and increase in intensity during the summer. In years favourable to rust development, the plant may be completely covered. Black teleuto spores are produced later in the season which can infect an alternative host *Ornithogalum sp.* The aecidial stage has been recorded only once in Britain and the secondary host is therefore probably of no importance in the over-wintering of the pathogen. It is likely that the pathogen over-winters in the uredospore stage on volunteer barley seedlings and winter sown barley crops.

Physiologic races

The pathogen has been shown to exist as a number of physiologic races, eight of which have been identified by Dr. B. Clifford of the Welsh Plant Breeding Station in the *Physiologic Race Survey of Cereal Pathogens.* The races have been classified in groups A to H; groups F and B have been most frequently identified and appear to be widely distributed.

Development and spread

Environmental conditions play an important part in influencing the development of the disease. High temperatures favour its development while low temperatures inhibit it. Therefore, at the beginning of the season, when temperatures are usually low, infection is delayed; later in the season, when temperatures are higher, development is much more rapid. The winters of

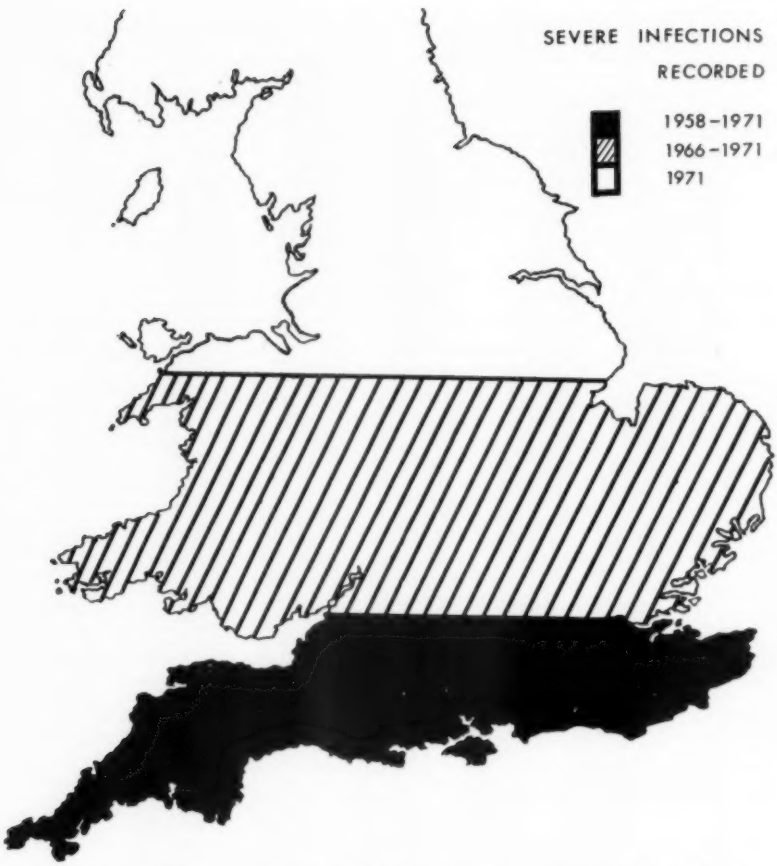

Fig. 1. Areas where severe brown rust infections were frequently recorded, 1958–1971

1969 and 1970 were generally mild and the fungus over-wintered successfully, providing a large reservoir of spores in the spring. In 1970 and 1971, following those mild winters, temperatures were high in early spring and brown rust appeared earlier and became more severe than usual.

Coinciding with those warm springs and summers was an increase in the acreage of spring barley varieties, which were very susceptible to brown rust infection.

Variety testing

The reaction of spring and winter barley varieties to infection by brown rust is examined in variety trials throughout England and Wales; in disease observation plots of spring barley in south west England, in 'spreader plots' at Cambridge (where small scale artificial epidemics are initiated) and in seedling tests in the glasshouse.

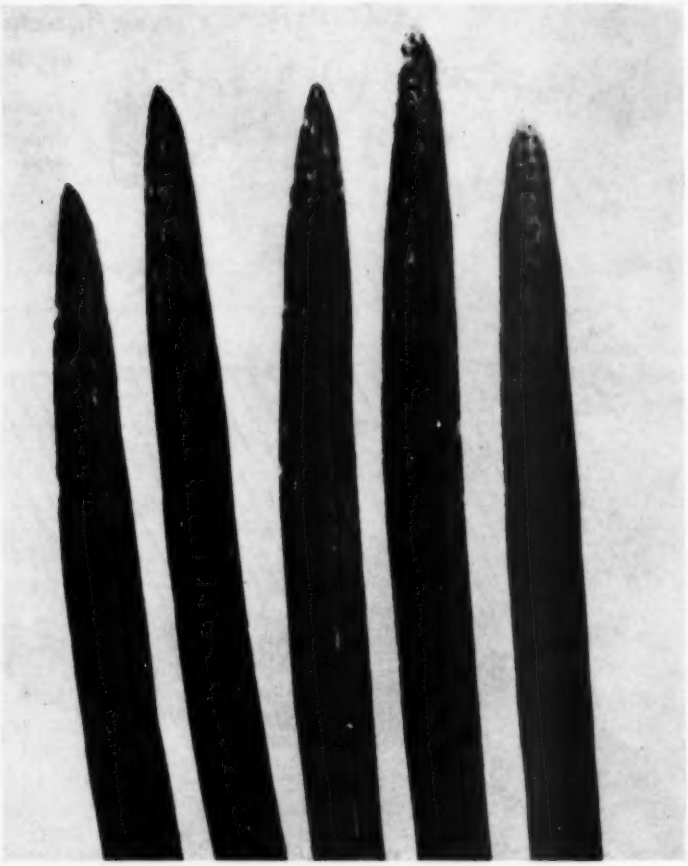

Plate 1. Barley leaves severely infected with brown rust

The percentage level of infection is recorded on each variety in naturally infected trials over a number of years. This information is summarized and the relative performance of each variety is used to produce a Recommended List figure on a 0–9 scale. Valuable additional information is obtained, especially when little natural infection is present on variety trials, from the artificial field tests where susceptible spreader plants are innoculated with a virulent and a less virulent race. The seedling tests give background information of the host-parasite genetic relationship.

No commercial spring barley varieties currently grown in Britain show complete resistance to brown rust; the majority are susceptible or very susceptible. A small number of varieties exhibit moderate resistance, and although they become infected the disease develops at a slower rate and the final level is lower than on a susceptible variety (Table 1). The winter barley varieties generally appear to be more resistant than the spring varieties; in some cases this may be due to an escape mechanism because they mature earlier in the season and thus avoid the more usual late development of rust.

Table 1
Reaction of Recommended List barley varieties to infection with brown rust

Variety reaction	Winter barley	Spring barley
Moderately resistant	Senta, Astrix, Mirra	Julia, Vada, Lofa Abed Hassan
Susceptible	Maris Otter	Zephyr, Proctor, Mazurka Wing, Berac Gerkra, Imber
Very susceptible		Midas, Deba Abed, Sultan

Effect on yield

Experiments in the South-West by S. Melville (A.D.A.S.) and J. L. Jemmett (N.I.A.B.), where plots were sprayed at weekly intervals with fungicidal chemicals, indicated that the effects of brown rust reduced yields by as much as 30 per cent and also drastically reduced thousand grain weight. In 1970 and 1971 yields from infected crops were very low in many areas.

Control

It is difficult to forecast how important this disease will be in the future because of the effect climatic factors play in its development. However, in the high risk areas (Fig. 1) it is advisable to take whatever precautions are available. In such areas the varieties which exhibit moderate resistance will reduce the risk of severe yield losses (Table 1).

The disease must over-winter on living barley plants and so volunteer seedlings should be eradicated as soon as possible after harvest. This will make it more difficult for the fungus to survive the period between harvest and the next winter barley crops and so reduce the level of inoculum in the following spring.

At present there is no chemical which can effectively and economically control the disease.

Acknowledgement

The authors wish to thank all N.I.A.B. and A.D.A.S. officers concerned with the disease recording and Mr. J. L. Jemmett for organizing the disease observation plots in the South-West.

J. K. Doodson, B.Sc., Ph.D. and **N. H. Chamberlain, B.Sc., M.Sc.**, are Plant Pathologists with the National Institute of Agricultural Botany, Cambridge.

Dairy event for Harrogate

The second International Dairy Farming Event is to be held on the Great Yorkshire Showground, Harrogate, on the 9th and 10th May, 1973.

In paying tribute to the co-operation of the Royal Agricultural Society of England during the highly successful 1972 Event, Mr. Harry Mills, Chairman of the Royal Association of British Dairy Farmers, said that although it had been decided not to return immediately to the National Agricultural Centre, his Association hoped it would be possible to hold its Event at Stoneleigh once again in the near future.

Facilities on the Great Yorkshire Showground are exceptionally good and should prove ideal for staging the Event. The R.A.B.D.F. is confident of a big response from farmers in the North of England and from Scotland as well as from the traditional dairying areas of the south and west.

For 1972, the Aberystwyth Symposium took the theme

Climatic Resources and Economic Activity

W. H. Hogg

THE fifteenth Aberystwyth Symposium was held at the Welsh Plant Breeding Station on 8–9th March, 1972, when sixteen papers were presented on topics relating to the theme: Climatic resources and economic activity. A wide field of subjects was covered, ranging from a description of microclimatological investigations in perennial ryegrass to drought in Australia, and from the occurrence of allergens in south Wales to the effect of weather on traffic. About one third of the contributions were of direct relevance to British agriculture and some of the ideas presented form the basis of the following discussion.

Climate and farm practices

Nobody in this country is likely to deny the importance of climate in farming although many farmers are inclined to the view that nothing can be done but to accept its vagaries. This attitude partly explains why an advisory meteorologist has far fewer day-to-day enquiries than, for example, a soil scientist. This is somewhat surprising when it is realized that the atmosphere comprises about half of a plant's physical environment and the whole of the environment for animals. Probably the relative importance of the atmosphere and the soil depends on the scale on which we are thinking, as any consideration of crop distribution on a continental scale emphasizes the major influence of climate. Although soils cannot be ignored, the extensive areas of wheat grown over those parts of the earth which were formerly temperate grasslands and the restriction of certain citrus fruits to frost-free areas are clear examples of the relationship between climate and crops. On the other hand, for smaller areas covering no more than a few parishes, the emphasis may be quite different. A British farmer may grow a variety of crops on his land but almost without knowing it he will have exercised his judgement in excluding many from his range of possibilities, certain that he is bound to fail if he attempts to grow, for example, oranges or rice. The emphasis on decisions concerning choice of crops is therefore thrown on to the other major physical factor, the soil. In the British Isles this is underlined by a complicated geological history giving rise to a wide range of soil types.

In the past, attempts have been made to use standard weather data such as temperature, rainfall and sunshine to indicate where particular crops could best be grown. This has been no more than moderately successful for an area as small as the British Isles. Recently the use of factors such as estimates of transpiration and soil moisture deficits have proved somewhat more realistic, but their eventual value in planning the use of our climatic resources is still somewhat doubtful. The advent of computers has led to a spate of investi-

gations in many parts of the world, incorporating the detailed analysis of every available weather statistic in relation to crop yields; it is arguable whether these have increased our knowledge or led to greater confusion. Inevitably one is led to ask: What are the best ways in which information on weather and climate can be used in agriculture and particularly in agricultural planning?

Probably almost every item of recorded meteorological information is of some relevance to plant production, even if only in a negative way, but clearly these differ greatly in importance. As a starting point, crop production may be regarded essentially as the conversion of solar energy, water and soil nutrients into economic end-products. This makes it logical to designate solar radiation and precipitation (or other methods of expressing plant water needs) as primary climatic controls in crop production without implying that other factors such as air and soil temperatures are unimportant. Some means is required to determine the yields which can be expected in given climatic environments and two papers outlined experimental work on Lolium perenne which adds to our knowledge of the interactions between weather factors and grass growth.

Dramatic effect of wind pruning

Grass and the environment

The report from the Grassland Research Institute dealt mainly with the effects of environment on grass growth, particularly in spring and autumn. One of the problems encountered is the difference in time scale between temperature fluctuations and the growth of grass. Temperature can vary markedly over short periods—hours or even minutes—but the standard measurement of crop growth in terms of dry matter production normally reflects environmental changes over a week or more; this suggests that some other biological indicator may be involved in the growth temperature relation-

ship. The use of heating cables beneath the turf has demonstrated that soil temperature just below the surface determines the rate of leaf extension. In early spring, the growing point, or meristem, is at or just below the surface and this appears to be the biological indicator.

During summer the effect of temperature appears to be small because of the overriding influence of solar radiation and water stress, but when these decrease in the autumn temperature again becomes important. However, for reasons which are not yet clear, the response of growth to temperature is less than in spring, especially at higher temperatures. Although it is clearly not economical to heat soil artificially to accelerate grass growth in spring and autumn, the demonstration of the importance of the meristem region suggests that selection and breeding may produce species whose growth at low soil temperatures is comparable with that obtained from the heated soil.

In addition to the primary climatic controls, solar radiation and precipitation, we may think of secondary and even tertiary controls. Among the secondary controls may be included the effects of topographical modifications, of which altitude is the most important example in relation to grass. One way in which the effects of hill climate may be partially counteracted is by using shelter. This has proved effective for other crops, particularly vegetables and fruits, in lowland situations but there has been some doubt as to the value of shelter in grassland areas, and it is now being investigated at Bangor University. Theoretically it would be expected that growth in sheltered areas should be increased because of a reduction in transpiration, and temperature changes also would be expected to affect growth. In the field, the effects are very variable according to the weather of the particular season. The wet spring of 1969 eliminated any effect of shelter on growth, which suggests that the temperature effects are negligible in such circumstances. In the dry spring of 1970, shelter increased dry matter both in the plain and on the hill, but the effect of shelter was considerably greater on the hill.

This and other similar work demonstrates that, in spite of encouraging progress in this field much remains to be done.

Local climate assessments

Meanwhile a practising agricultural meteorologist, like his A.D.A.S. colleagues, must provide advice and guidance based on existing knowledge and information, however incomplete. For example, he has a part to play in the classification of agricultural land and in this he is more likely to be concerned with local climate than with the general climate. Naturally, every possible use is made of existing climatic data, but these are often of only limited value for small areas. An obvious example is the very patchy distribution of the spring frosts which may be decisive in relation to orchard sites. The same is true for mist and fog in certain weather situations, and while this may be of only indirect significance to agriculture, recent experience on the motorways serves to remind us of its importance to other sections of the community. Such examples suggest that new thought on the type of climatic information collected may be valuable. Instead of relying entirely on the collection of data over long periods from a network of stations which can never be complete enough to meet all requirements, a series of short term local studies embracing different land forms would help in our climatic assessments for similar land forms elsewhere. Another potentially valuable study could deal with the changes which occur moving inland from the coast.

In a general manner the variations in temperature, sunshine and rainfall are understood but any detailed assessments have to be made from too few observations.

Aerial photography as an aid

Perhaps we could go even further and for some purposes dispense with conventional observations and try to obtain an overall view of the local distribution of frost and fog from aerial photographs made in specified weather. Also, since plant diseases can be shown up by aerial photographs, it could well be that frost damage to plants could also be identified in this way. Considering the military information which can be deduced from photographs, there is a chance that the shaping and pruning of trees and shrubs could be picked out which would aid the classification of areas sufficiently exposed to affect production. The statistics of wind direction and strength may support the general contention that a particular area has an exposure risk; but because the topography of the surrounding countryside may provide local shelter it is usually hazardous to come to a definite conclusion without seeing the land. If aerial photographs can serve as a substitute for field work, a great saving results.

Weather and management

Although it is essential for the agrometeorologist to understand the physical and biological responses to weather and climate, increasingly he feels that he should go further, studying the economic consequences of weather and helping to direct management decisions. These decisions cover a wide range; for example, the most fundamental relate to the general type and aims of the particular farm, and they extend to decisions concerning the type of work which should be done on a given day.

Overall, farming is an industry where production, the demand for produce and its distribution all depend on the weather, not only locally but on a national and global scale. At present the meteorologist is able to give a good deal of useful advice on the tactics of farming but he should aim to give more guidance on its strategy, as the biggest pay-off results from the correct strategy. Although the occurrence of weather events may seem random, merely to know how often specified weather is likely can aid fudamental decision making. For example, a knowledge of how much irrigation is required over a period of years for grassland can provide the basis for decisions on the best stocking rate. The methods of Operational Research can be applied to many such problems, as they aim to optimize the return under constraints, of which weather may be one.

The convenor of the Symposium, Mr. J. A. Taylor, is to be congratulated on the quality of the speakers he invited from the British Isles and overseas. The papers and discussions were of a high standard and when published they will form a volume which is both informative to the specialist and of considerable interest to the general reader.

W. H. Hogg, M.Sc., was formerly a Principal Scientific Officer with the Meteorological Office and is now a partner in the firm Environmental Consultants.

Buildings for Single Sucklers in Breconshire

J. D. T. Ridd, A.R.I.C.S., *Lands Arm, A.D.A.S., Llandrindod Wells*

BRECONSHIRE, with its old red sandstone soil, cut off from the coal fields of South Wales by the Brecon Beacons and naturally open to Herefordshire by the beautiful Wye Valley, is a stock rearing county of cattle and sheep. The cattle are predominantly Herefords and the rearing of pedigree Hereford bulls reflects the stockmanship and pride of many of its family farms, and has done for many a long year.

In order to come to grips with the labour and economic challenges which these family farms, with their limited potential for mechanization, are facing today, the farmers, mostly owner-occupiers, have been investing capital in new fixed equipment and replacing the existing stone and slate buildings, giving economy of scale, labour and maintenance whilst making use of modern materials that resist both stock and weather; for this is an exposed upland area, much of it rising into the Brecon Beacons National Park.

Local influences

In such an area considerable scope still exists in using sloping sites more fully, enabling easier off-loading to barns and from barns to cattle sheds. No matter whether the building is excavated into the land contours or built out from them, much can be done with modern materials, their various profiles, colours etc., to create a 'family likeness' with existing buildings and a compatibility with the local landscape. The use of space boarding holds both a functional and an amenity factor.

Building styles

Initially the style of building favoured was a central barn for bulk storage with two lean-tos; whilst in the shorter lengths this is satisfactory, ventilation problems can develop in lengths of over 45 ft. This has led to the lean-to being replaced by a ventilated ridge-roofed building which is proving satisfactory and far more acceptable visually.

Good ventilation is absolutely basic and is a foremost consideration in any new building. The necessary air movements are obtained by ridge vents and by space boards in the rear and gable walls. As an alternative, on a site particularly exposed to prevailing wet weather, side sheeting is carried down to lap the wall below by some 9 in. and then canted out to allow a 4 in. continuous gap which gives an adequate upward air intake, preventing condensation and excessive humidity.

A variation of the lean-to has recently been appearing with dropped eaves to the barn. This design is chosen where snow is likely to cause a problem to valley gutters and where wide spans cause ventilation problems. The altera-

An example of good ventilation

tion of roof levels is obtained by increasing the height of the barn by 2 ft. Air movement is facilitated and the visual break in roof line looks better.

Whilst ventilation is essential, it is desirable to prevent low level draught in the lying area. This is achieved by bringing the rear and gable walls up to a height of 6 ft and positioning the large doors necessary for mechanical cleaning out in the gable end walls adjacent to the feeding barrier.

The width of the cattle shed is the most important basic measurement. It is often possible to lengthen a shed but much more difficult to increase its width. A building 38 ft wide will allow the change of techniques from traditional hay and straw bedding to cubicles and silage by minor modification to the gable end walls and will still allow an adequate calf creep.

Bedding economies

Most of the land from which bracken was cut for bedding has been improved; home produced straw is not abundant and methods to economize in bedding are necessary. To this end advantage is taken of the free draining soil and concreting in the cattle shed is confined to a strip not more than 10 ft back from the manger. This strip is scraped out two or three times a week. In the lying area, between the concrete strip and the rear wall, a considerable saving in straw is achieved by providing, at the start of the season, bedding laid one bale deep with strings cut and removed. This method has proved so successful that cubicles, which restrict capacity and are to some degree a hazard to young calves (which at turn out time can be up to five months old), have not maintained their popularity.

Feeding arrangements vary, but vertical barriers built above three courses of concrete blocks are usual; this arrangement deters calves getting into the manger. The sloping barrier has not been popular, perhaps because local craftsmen find constructing the vertical barrier more to their liking.

The provision of water is usually by tank fitted with a ball tap. With need to conserve bedding, most of which has to be purchased, the tanks are sited in the end pens on the gable walls near the unbedded concrete strip.

Fire risks

Keeping fire hazards to a minimum is difficult in a building such as is described here, where hay is stored, cattle are bedded on straw and ventilation is abundant. It is, therefore, all the more essential to ensure that stock pens enable escape to either end of the shed. Regular inspection of electrical wiring to make sure it has not been damaged by vermin or chaffing and prevention of exhaust sparks from tractors used in building are other essential precautions.

The provision of a simple form of cattle race could also prove a considerable asset to the layout, particularly as the Brucellosis Schemes gain way.

Agriculture in Breconshire, and in particular cattle husbandry, has benefitted from the modernization of its cattle housing; the bringing together of the bulk fodder and cattle is the result of logical planning. The ability to provide a dual function for such a large capital outlay is reassuring. The new buildings provide a large roofed area which can be used for other purposes when not required for cattle, from an implement repair shop, shearing and sheep handling, corn storage and turkey production to barn dancing!

Entry into the E.E.C. should provide opportunities for a stock rearing county such as Breconshire to enhance the benefits already experienced by those with easily run, easily maintained holdings.

Yorkshiremen Scoop £100 Prizes in Young Farmers Club Contest

For the second year running Yorkshire entrants dominated the £100 West Cumberland Farmers-sponsored contest organized by Northern Area Young Farmers' Clubs, which took place recently at Lancaster.

Winner of the £60 first prize was Stuart Verity, of Rhylstone, Skipton, a farmer and a member of the Coniston Cold club.

Runner-up, and winner of £25, was last year's winner, Sidney Pearson, also a farmer, from Snainton, Scarborough.

A joint entry by two of the youngest competitors, 17-year-old schoolboys Harry Raw of Lyon House, Eastburn, Keighley, and Michael Wallbank, Intake, Embsay, Skipton, won the £15 third prize.

The subject of the competition, open to Y.F.C. members throughout the North of England, was 'The Future for Beef and Lamb Production'. After briefing visits to the M.A.F.F. experimental farms at Redesdale, Northumberland and High Mowthorpe, East Yorkshire, entrants had to submit written papers, including budgets, and were then interviewed by a panel of judges.

The judges, Mr T. E. Wathan, of A.D.A.S., Mr W. Wannop, a director of West Cumberland Farmers, and Mr B. Wilson, a banker, had high praise for the standard of entries.

Bracken Poisoning in Pigs

J. D. J. Harding

BRACKEN poisoning in pigs is probably not common but it does occur and well-grown, valuable pigs have died from it. We know of the incidence of five natural outbreaks of the disease. In one the farmer complained of abortion and nervous symptoms in sows, but in most cases the pigs were either found dead or died quickly after a short period of heavy breathing. Experimentally, pigs have been poisoned with the underground part of the plant (the 'rhizome'), but not with the leaves or fronds.

Professor W. Charles Evans, of the University of Bangor, comments on bracken poisoning: 'Bracken contains two poisonous agents. One of these kills cattle by interfering with the normal activity of bone marrow where blood cells are made—leading to the disappearance of white blood cells and platelets from the circulating blood stream, thus causing haemorrhages and susceptibility to infection. In smaller doses and over a longer period of time, this substance is a carcinogen and causes bladder tumours in cattle with consequent haematuria. The substance appears harmless to pigs and horses, at the dosage level it occurs in the plant.

The second poison, which is the important one in pigs and horses is an enzyme which destroys vitamin B1 ('thiamine') in the food passing through the intestine, and the animal really dies of thiamine deficiency. Interestingly enough, the ruminant animal is not affected by this enzyme, presumably because, being a protein, it cannot enter the microbial cells in the rumen which have the power to synthesize their own thiamine; when these eventually reach the abomasum or true stomach the bacterial cells are broken, thus releasing their thiamine complement in an acid environment where the enzyme is largely inactivated—and it thus becomes available to the animal.

It might be wondered why sheep—which are the main farm animals grazing bracken land—rarely suffer; one reason seems to be their selective grazing behaviour, and so they do not eat enough of this plant to show symptoms. Experimentally, it can be shown that sheep are more resistant to the toxins in bracken than cattle. Nevertheless, a condition met with on the North Yorkshire Moors, called 'bright-blindness' (retinal atrophy) in sheep, has been definitely associated with the ingestion of bracken, although the causative agent in the plant has not yet been identified.

Our experimental pigs at the Central Veterinary Laboratory were housed and watched carefully, so we saw early signs of listlessness and reduced appetite which would probably have gone unnoticed if the animals had been in a wood or on a hillside or moor. Obvious symptoms appeared suddenly, with inability to stand and very heavy breathing; death followed within six hours. Under outdoor farming conditions many such cases would probably be called 'sudden death'. We know of one outbreak where all seemed well until the pigman noticed that one pig had been leaning against the same tree for two days. He gave it a push and found it to be dead.

On post-mortem examination the most striking changes are in the heart, which is enlarged and mottled with patches of yellow, red and puce. The other organs show changes typical of acute heart failure. Microscopic examination of the heart muscle reveals a picture which is unlike any other common disease of pigs.

Injection of thiamine will cure pigs in the early stages of the disease, provided they are spotted in time. Since the poison in the bracken rhizome destroys the thiamine in the intestinal contents, adding more thiamine to the food in not likely to do much good. Our experimental pigs were being fed a ration one-third of which consisted of bracken rhizome and they took fifty-five days to die, so an injection of thiamine would probably give protection for a considerable time.

To summarize, if your pigs are running on land where bracken grows or has recently been ploughed up and one suddenly dies, do ask your veterinary surgeon to carry out a post-mortem examination and to arrange to have the heart muscle examined microscopically. If the findings suggest bracken poisoning, the pigs should be removed from the bracken-infested land, or they should be injected with thiamine, or preferably both!

J. D. J. Harding, B.V.Sc., M.R.C.V.S., D.V.S.M., is a Senior Research Officer at the Central Veterinary Laboratory, New Haw, Weybridge.

Duck Plague

An outbreak of duck virus enteritis (duck plague) in wild duck in Hertfordshire was confirmed by the Ministry. It is an acute, infectious disease which can also affect geese and swans. Domestic fowls are not susceptible. Although diagnozed in various parts of the world in recent years, this is the first time in this country and it is assumed to have been introduced by migratory birds. It is not a notifiable disease.

Duck plague can cause heavy mortality, especially in adult birds, but it is very unpredictable. Symptoms include listlessness, marked depression, drooping wings and a disinclination to move or take to water. There may be ruffling and dullness of feathers; moist eyes leading to eyelids swelling and sticking; increased nasal discharge, increased thirst or watery diarrhoea. The bird's call may be hoarse and breathing laboured, especially when frightened or forced to move. It may not walk normally but creep and stretch its wings listlessly. In very acute cases not all symptoms may be seen. Sometimes birds appear to recover and then show symptoms of increasing severity often leading to death.

Diagnosis depends upon the infected flock's history and upon post-mortem examinations. Laboratory testing of suspected carcases many be necessary. Incubation is 3-7 days but affected birds may be ill only 1-3 days. There is no effective treatment for diseased birds but vaccination may prevent the disease and vaccine is available through the Animal Health Trust. The virus does not survive in a clean, dry environment and is killed by heat or disinfectants such as those approved for use against fowl pest.

Although no reports have been received of disease in domestic ducks, commercial duck producers are advised to adopt strict security and hygiene measures. Where possible, producers should prevent contact with wild ducks and not visit other duck farms. They should keep visitors away from their birds; essential visitors should wear protective clothing and carry out personal cleansing and disinfection when entering and leaving premises.

Further advice may be obtained from veterinary surgeons or the Ministry's Divisional Veterinary Officers. A leaflet can be obtained from the Ministry's local animal health offices, from the Ministry of Agriculture, Fisheries and Food, (Publications), Tolcarne Drive, Pinner, Middlesex HA5 2DT, or from the Department of Agriculture and Fisheries for Scotland, Animal Health Branch, Chesser House, Gorgie Road, Edinburgh EH11 3AW.

A dairy farm on the Cheshire Plain

10. Cheshire

R. Hope

THE county of Cheshire contains half a million acres of agricultural land, most of which lies on the fertile plain sheltered by the mountains of Wales on the west and by the Pennines in the east. The area includes a mere 3,000 acres of rough grazing found mainly in the uplands on the county's eastern border. Altitudes on the plain rarely exceed 400 ft and more often are below 200 ft above sea level. The flat or very gently undulating nature of the plain emphasizes any minor elevations such as the low sandstone range of hills dividing the western half of the plain in a north/south direction. Any tendency to monotony is broken by the numerous meres and marl pits, which are so characteristic a feature of the Cheshire countryside, and by the wealth of trees found in the hedgerows of the comparatively small fields as well as in the frequent small spinneys.

Soils and climate

The soils of the county are mainly derived from glacial deposits, and are quite variable. Light to medium loams predominate in the northern and

eastern parts of the county, while in the south medium to heavy clay loams are typical. The heavier soils often suffer from impeded drainage; they are unsuitable for arable cultivations and are mainly under permanent grass. Irregular areas of light soils are found where the underlying sandstone has been pushed up through the glacial drift, but most soils have been formed from the drift material itself. Altogether there is much variation, and it is not uncommon to find marked changes in soil texture from field to field on the same farm.

The annual rainfall is around 28–30 inches, except in the eastern hill region where it rises to 50 inches or more. Approximately half of the annual rainfall occurs in the summer months and is fairly evenly distributed over the growing season. Average temperatures are experienced with comparatively mild winters. Droughts are rare and even in the drier summers the Cheshire landscape retains its characteristically green and luxuriant appearance.

Grass and dairy products

With its retentive soils and ample but evenly distributed rainfall, the county possesses natural advantages for growing grass. More than half the land area is under permanent grass, much of it on heavier soils in the southern half of the county. Here the productivity of the land is reflected in high stocking rates and this part of the county is one of the most intensive dairy farming districts of the country. The dairy cow reigns supreme in south Cheshire and there can be few areas so heavily committed to one farming product. Traditionally this was the old cheesemaking area and, while the emphasis is now on production for the liquid milk market, a small but vigorous farmhouse cheesemaking industry still persists with an increasing demand for the high quality Cheshire cheese it produces.

To support the densely stocked dairy herds, grassland management is intensive. The application of 200 units or more of nitrogen per acre is commonplace. Large quantities of silage are made, usually in covered clamps with self-feeding arrangements. Controlled grazing is practised, with both strip grazing and paddock grazing systems much in evidence. Poaching is a special problem on the heavier soils where drainage is impeded but in spite of such difficulties production from the grassland is high.

Pig fattening enterprises are found on many of the dairy farms. Some of these are quite large scale secondary enterprises, a relic of the old cheesemaking era and its whey feeding.

The arable north

In the northern half of the county the farming scene changes. Here the soils, although variable, are lighter than those in the south, and more suitable for arable farming. Traditionally, north Cheshire is an arable dairy farming area, with cereals, potatoes and milk as the main products. On the majority of farms a ley farming system is practised, a common rotation being potatoes followed by two cereal crops (wheat and barley) and then by a 2 or 3 years ley. Wheat and potatoes are the main cash crops.

Whenever possible early potatoes are grown and usually more than half the total potato acreage consists of earlies. Suitability of the land for these varies considerably, the most favourable situations being on undulating land where the southerly slopes are free from late spring frosts. Liftings commence in early June and in isolated instances even at the end of May, but usually

substantial lifting takes place about the middle of June. Catch crops of kale or Italian ryegrass are commonly taken after the earlies are harvested, and these second crops are an invaluable aid to milk production in the autumn and early winter months.

Hill farms

Rising from the Cheshire plain on its north eastern borders to altitudes up to 1,800 ft above sea level is the hill area of the county, and its most difficult farming area. The soils are variable but mainly derived from millstone grit. Rainfall is heavy, averaging 45 inches per annum, and the winters are long and cold. In spite of these drawbacks milk production is still the most important enterprise on the hill farms, but the higher hill grazings are suitable only for sheep and the farming system practised is perhaps best described as milk with sheep. It is here where most of the county's sheep are found. Breeds of sheep vary widely, Cluns and Kerrys being found at lower levels, while the Gritstone is predominant in the higher hills, with Swaledales, Dalebreds, Lonks and their crosses.

Horticulture

Cheshire also has an important horticultural industry serving the two great markets of Manchester and Liverpool. Although market gardens are scattered over the county, the main concentrations occur on the southern fringe of Manchester and in the Wirral peninsula with its semi-maritime climate. Glasshouse production is a prominent feature of Cheshire's horticulture and on the majority of the market gardens some glass is found. The main glasshouse crops are lettuce followed by tomatoes and then by chrysanthemums.

* * * *

Ministry Publications

Since the list published in the June 1972 issue of *Agriculture* (p. 268) the following publications have been issued.

FREE ISSUES

ADVISORY LEAFLETS

No. 283. Advice to Intending Beekeepers (Revised)
No. 313. Wild Onions and Ransoms (Revised)
No. 392. Lettuce Aphids (Revised)
No. 579. Cereal Mildew (New)
No. 580. Leaf Blotch and Halo Spot of Barley (New)

SHORT TERM LEAFLETS

No. 72. Weed Control in Horticultural Brassicas (Revised)
No. 138. Group Operations for Silage Making (New)
No. 139. Group Operations for Sugar Beet (New)
No. 140. Group Operations for Waste Disposal by Tanker (New)
No. 141. Emergency Collection of Bulk Milk from Farm Vats (New)

Single copies of free items are obtainable from the Ministry of Agriculture, Fisheries and Food (Publications), Tolcarne Drive, Pinner, Middlesex HA5 2DT.

in brief

- **Animal behaviour**
- **Beef in variety**
- **More milk**

Animal behaviour

DESPITE man's association with his farm animals for thousands of years, it is only in modern times that a disciplined inquiry into animal behaviour has been slotted into agricultural research. Quite apart from the academic interest in behavioural patterns themselves, it is the interpretative use to which that knowledge can be put in terms of day-to-day husbandry practice that makes it so valuable. Hence the interest shown in four papers on this subject which were read at the winter conference of the British Cattle Breeders' Club, now summarized in the Club's Digest (No. 27).

Every dairy farmer and stockman knows the 'boss' animal in his herd and the accepted hierarchy that puts the leader in front at milking time and, other things being equal, the rest of the herd in descending order of age seniority. But as Roger Ewbank pointed out, since the older cows coming into the parlour first tend to have a higher incidence of mastitis than the younger animals, the milking machine becomes a distinctly possible medium of spreading the disease. Batching up and milking the younger animals first is the obvious answer, but an inherent sense of precedence will cause a reversion to the old order once the artificial control is lifted. Also on the subject of mastitis Mr. Ewbank referred to a study of the time spent lying down by a herd of housed and tied-up Friesian cows and, in particular, individual preference for inclining to the right or left, i.e., with the right or left side of the udder in contact with the floor. Unless, therefore, the cowman ensures that the cubicles are always well littered, chilling of the udder can readily predispose the animal to the complaint.

Dr. D. B. Stephens reported on observations made at Babraham on groups of Friesian calves reared in open pens on an artificial milk feeder. Their behaviour at the teat demonstrated a social order where might is right, the heavier calves displacing smaller calves and spending relatively more time sucking. A minority group, indeed, seemed to be socially quite inadequate and incapable of learning to approach the artificial teat on their own—a circumstance which again calls for human watchfulness and intervention.

Belief in the 'confidence trick' of fostering a lamb on a ewe by a false scent, one of the oldest pieces of shepherding lore, was shaken by Mr. J. R. Bareham's exposition of mother–offspring relationship in the first few hours after birth. For eight hours after parturition the ewe will in fact, he said, accept the first lamb she is given if her own is not present. The lamb's location of the udder is its first and vitally important need and occurs naturally in the process of the ewe's initial licking. From the start its teat-seeking efforts are concentrated in the soft, leg regions of the ewe, and in experiments in which lambs were removed from their dams at birth and given discrimination tests, the preference for soft objects such as foam was characteristically marked.

Such papers as these and others which combined the theoretical and practical aspects of animal husbandry are of such undoubted value to livestock farmers as to

stimulate membership of the British Cattle Breeders' Club, which was founded after the last war by the late Sir John Hammond as an essential link between scientist and breeder. Next year's three-day conference is being held at the University Arms Hotel, Cambridge, January 15–18th, details of which can be obtained from the Secretary of the Club, 'Lavenders', Isfield, Uckfield, Sussex.

Beef in variety

TOM TWEDDLE, writing in the current issue of the *OECD Agricultural Review*, visualizes that in the future, as in the past, all sorts of beef will be produced from a growing multitude of breeds and crosses, and under various production patterns and systems which also carry the impress of individual farms and seasonal influence, especially where grass is the pivotal crop. Of the potential of world demand for more meat, particularly as living standards rise, there can be no vestige of uncertainty; but it has also to be remembered that beef is but one kind of animal protein and the market competition between meats therefore becomes of extreme importance to the producer.

The author points to the supply of calves for beef as the inescapable key factor; so that beef production in all its modern ramifications and disparate systems rests solidly upon the dairy herd and the associated perplexity of how to get more beef calves without 'opening the flood-gates of milk surpluses'. Mr. Tweddle suggests that improved herd health, especially breeding health, can help in this respect; also better calving percentages, fewer abortions, reduced need for herd replacements, would all allow for more dairy cows to be bred to beef bulls: additionally, the increased use of crossing sires from the bigger breeds will greatly improve the potential carcase weight of the finished product.

The demand for beef is not, however, confined to greater quantity. Consumer-dictated considerations impose a level of uniformity in which lean carcases carrying a minimum of fat (and that white rather than yellow) feature prominently. 'Desirable carcases', says Mr. Tweddle, 'will be those that satisfy producer, butcher and consumer. They will most likely result from the use of intentionally bred, long, clean-fleshed, fast-grown animals, managed in systems of production geared to the farm. Finishing periods will be carefully planned and controlled as being expensive in feed and if overdone can ruin the carcase for all but limited markets.'

Within the modern options of beef breeding resources and the extensive variety of production systems, the farmer's thinking must basically be directed upon the end product—what, when, where and how it is to be sold—and this strictly related to his economic ability of doing so.

'Overall', says Mr. Tweddle, 'we shall continue to produce all kinds of beef from the multitude of types of calf available, born all the year round using the wide variety of feeds and grazing at our disposal. In this way the great variety of market outlets will continue to be satisfied. Variety is said to be the spice of life; it may also be the future success of beef production.'

More milk

HIGHER yields per cow over the twelve months ended 31st March have set up an all-time record for off-farm sales of milk in England and Wales, according to provisional figures issued by the Milk Marketing Board—close on 2,336 million gallons. This is an increase of 3·5 per cent over the 1970–71 figure, which was itself a record, and is largely attributable to last year's favourable weather and especially the benign winter. There was a slight increase in the size of the national dairy herd, but the number of registered milk producers fell during the year from 76,150 to 72,271. Less milk was sold in the liquid market (1·3%) compared with that in 1971–72. Dairy product manufacture took up an additional 12 per cent, to 894 million gallons—cheese accounting for an extra 45 million gallons, and butter another 43 million gallons. Milk used for fresh cream also rose to a record level of approximately 153 million gallons, compared with 154 million gallons in 1970–71.

AGRIC

Books

The Village Blacksmith. RONALD WEBBER. David and Charles, 1971 £2.

Spreading chestnut trees apart, the village blacksmith seen in retrospect is a distinctly romantic figure; and 'in retrospect' is the operative phrase for, along with all other crafts that once served less sophisticated communities, that of the blacksmith has passed into the mists of folklore. A few such men still ply their trade where horse and pony-riding are growing leisure features of the countryside, and some others have turned to the more lucrative ornamental wrought-iron work, or simply welding and the odd job. But the old forge as such, where it survives at all, serves only as a tourist attraction.

This, then, is the residue from which Ronald Webber has made his researches and captures within his well-illustrated book the essence of a craft that has evolved over thousands of years and the legends, mysteries and superstitions which have entwined themselves about its growth. The old tools of the farrier, the smith's hearth and the anvil set on its massive elm base, are knowledgeably described by the author, who knew them intimately as a boy in his father's smithy.

He recalls the 'mighty men', from the mythical Wayland Smith (who, legend says, is still in business close to White Horse Hill in Berkshire) to the redoubtable Cornish-born Bob Fitzsimmons who took the world boxing championship from the American, Corbett, after fourteen gruelling and sanguinary rounds at Carson City. He remembers, too, the immortal place of the smith in literature and song and the blacksmith priests of Gretna Green, where marriage over the anvil became the fashionable and exciting sequel to elopement.

Beyond question, Mr. Webber's book is a meritorious memorial to a long line of master craftsmen whose like we shall never see again and who in their lifetimes were at the very centre of progressing civilization.

S.R.O.H.

Farm Workshop and Maintenance. THE BOOK OF THE FARMERS WEEKLY SERIES. Crosby Lockwood and Son, 1972. £1·90.

This book is a collection of a series of practical articles which have appeared in *Farmers Weekly*, and its format, with pages about 10 in. wide, is reminiscent of the source.

It begins with advice on setting up and equipping a work bench and the choice of a tool kit.

In 'Everyman his own Mechanic' we see how one farmer attended a course at his local college and subsequently went much further than most farmers could justify along the 'own mechanic' path.

Ingenious solutions of individual problems tend to show how obsolete equipment can be modified to make them a little nearer modern designs.

There is some general engineering information on horsepower, hydraulics, gears, and tractor fuel and lubrication systems. Hints on overhauls cover ploughs, beet harvesters, manure spreaders, finger-bar mowers, sprayers and rotary cultivators. Gas and electric welding and gas cutting are covered in some detail.

Miscellaneous topics include some aspects of operation and maintenance of common implements and machines.

It was evidently not easy to make the book follow any clear pattern, but an index helps the reader to find his way.

C.C.

T.V. Vet Book for Stock Farmers No. 2: Calving the Cow and Care of the Calf. 2nd Edition. Farming Press, 1972. £2.

Apart from a slight increase in price, the second edition of this book differs from the first edition published in 1965 only by the addition of a section on Hydrops and one on Infertility, whilst the section on Calf Rearing has been rewritten. It is doubtful if the two additions have greatly enhanced the value of the book as they are very brief; infertility in particular is a sizeable topic and one which can hardly be considered appropriate to the subject of 'Calving the Cow'.

The outstanding features of the book are the photographs and the practical hints based on the author's experience. These should be of value to the farmer and stockman in their everyday work and in the understanding of some of the veterinary surgeon's tasks.

P.S.B.

FARMERS—Have you posted your **CEREALS CLAIM** yet? Forms **MUST** reach the Ministry of Agriculture, Fisheries and Food by 31st July.

Agricultural Chemicals Approval Scheme

There are no Additions or Amendments to the 1972 List of Approved Products for Farmers and Growers this month.

ACKNOWLEDGMENT OF PHOTOGRAPHS

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Pp. 281, 283, 284, 285 and 286, Shropshire Farm Institute. P. 290, *Halifax Courier*. P. 304, N.I.A.B. P. 307, W. H. Hogg. P. 315, R. Hope.

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Ministry of Agriculture Fisheries and Food

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Each vegetable is taken alphabetically and the diseases likely to attack it are described. Control measures are also given.
(Bulletin No. 123) **62½p (69p)**

Brown Rot Diseases of Fruit Trees

An authoritative bulletin on these diseases and the fungi that cause them; the author was a leading authority on the subject for many years. Illustrated.
(Technical Bulletin No. 3) **40p (46½p**

Soils and Manures for Vegetables

Covers all aspects of vegetable growing. Among these are soils, mineral nutrition, types of fertilizers and their placement and use, and a section on recommendations for particular vegetable crops.
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(Bulletin No. 48) **62½p (69p)**

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(044)

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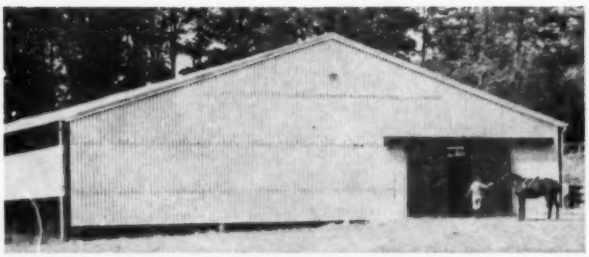

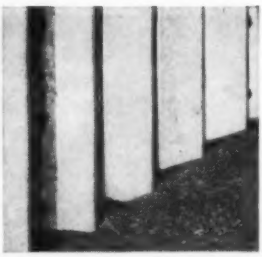

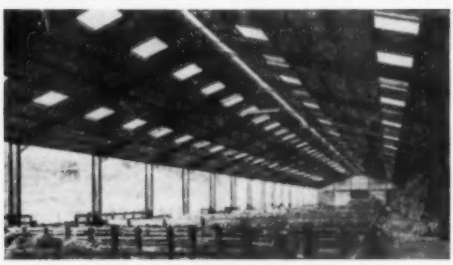

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